

# Königsmann Theory – Appendix 2

## The Structural Order of the Universe and Cyclical Recurrence

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### 1. Introduction

This second appendix to the Königsmann Theory expands the model by introducing the central idea of a **cyclical structure of the universe**. This structure arises from harmonic interactions between expansion and backflow, based on fractal spacetime processes. The infinity symbol ( $\infty$ ) represents a continuous, self-regulating system and replaces the classical notion of a one-time Big Bang.

### 2. Foundational Assumptions about the Universe's Structure

The universe is organized **fractal** in nature: self-similar structures repeat across all scales. These fractals are formed by **dark matter streams** flowing along **hexagonal energy paths** in the quantum vacuum, creating dynamic vortex formations. The **Golden Ratio** ( $\phi \approx 1.618$ ) governs the harmonic order, from subatomic particles to galactic formations. The infinity symbol ( $\infty$ ) expresses the **topological continuity** of a universe with no beginning and no end.

### 3. The Role of Expansion and Backflow Dynamics

Cosmic expansion leads to density dilution at the edges. Simultaneously, a **dark matter backflow** is driven by pressure differences, gravitational potential, and localized energy minima. The particle velocity, such as that of the graviton, is modeled as:

$$v \sim \frac{1}{r \cdot \rho \cdot p},$$

with  $r$  = radius,  $\rho$  = density, and  $p$  = counterpressure. At low counterpressure, gravitons may propagate faster than light.

A time-dependent backflow term is added to the field equation:

$$-\beta(t)(\partial_r \psi)^2 g_{\mu\nu}, \quad \beta(t) = \beta_0 \cdot \sin^2\left(\frac{\pi t}{T}\right),$$

where  $\psi$  describes the backflow field, reflecting the flow of dark matter across cosmic cycles.

### 4. The Informational Structure of the Quantum Vacuum

The theory posits a **structured informational matrix** embedded in the quantum vacuum. Even in a full implosion scenario, this structure persists and transfers fractally to the next expansion phase via  $\Phi^n$ -modulated pathways. The vacuum doesn't store information classically but through the **arrangement of energy flows**, preserving a timeless memory across cycles.

### 5. The Infinity Loop as a Cyclical Principle

The  $\infty$ -topology forms the core of the model: the universe breathes in cycles, where matter and energy are compressed into a **central supervortex** and then re-expands. Structural dissolution at the boundaries triggers a new expansion phase. The direction of flow **inverts periodically**, while the fractal framework remains intact.

Topological invariants such as the **Chern number** provide stability:

$$C = \frac{1}{4\pi} \int \epsilon^{ij} F_{ij} d^2x, \quad F_{ij} = \partial_i A_j - \partial_j A_i,$$

with  $A_i$  being the vortex vector potential.

## 6. Mathematical Description of the Fractal Dynamics

The dynamics of the system follow three fundamental dependencies:

a) **Particle velocity:**

$$v \sim \frac{1}{r \cdot \rho \cdot p}$$

b) **Fractal frequency:**

$$f = f_0 \cdot \phi^n \cdot e^{-\Delta p}$$

c) **Backflow range:**

$$R = \frac{P}{E_b} \cdot k$$

The modified field equation becomes:

$$G_{\mu\nu} + \Lambda g_{\mu\nu} + \alpha(\nabla^2 \Phi_\phi) h_{\mu\nu} - \beta(t)(\partial_r \psi)^2 g_{\mu\nu} = \frac{8\pi G}{c^4} T_{\mu\nu}$$

with:

$$\Phi_\phi(r, t) = r^{-\phi} \cdot \cos\left(\frac{2\pi t}{T}\right) \quad \text{and} \quad \nabla^2 \psi = -\frac{\beta(t)}{r \cdot \rho \cdot p} + \frac{8\pi G}{c^4} T_{\mu\nu}$$

The coupling to cosmic energy is defined by:

$$\beta_0 \approx \frac{8\pi G \rho_0}{c^2} \cdot 10^{-6}$$

The quantization of the backflow field  $\psi$  is modeled by:

$$\Psi(x, t) = \sum_n \Phi^n \cdot e^{-iE_n t/\hbar}, \quad E_n \propto \phi^n$$

## 7. Conclusion and Outlook

This second appendix to the Königsmann Theory presents a **cyclical model of the cosmos** based on harmonic feedback between expansion and backflow. The  $\infty$ -symbol does not represent stasis but a **fractal, energetic, and timeless structure**. The extended field equations allow for concrete predictions, such as:

- **Euclid Data (2025):**  $\phi$ -modulated density deviations ( $\sim 1\%$ ) vs.  $\Lambda$ CDM at redshift  $z > 2$
- **LISA Mission:** Gravitational waves with frequencies modulated by  $\phi^n$

Next steps:

- Calculation of **Chern numbers** as topological invariants
- Full **quantization of the backflow field**  $\psi$